AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remains under examination in the application are presented below. The claims are presented in ascending order and each includes one status identifier.

1. (Previously Presented) A device for determining a movement of an eye, comprising an illumination unit, which generates optical radiation during operation and emits it as an illumination ray bundle for illumination of at least one region on the cornea of the eye;

a distance-determining unit, which senses, in a temporally resolved manner, the illumination ray bundle returned by the cornea as a detection ray bundle and generates a distance signal using the received optical radiation of the detection ray bundle, said signal corresponding to a distance of the cornea from a reference plane, which is defined relative to the distance-determining unit; and

an evaluating unit which, using said distance signal, generates a position or movement signal corresponding to a position or movement of the eye.

2. (Previously Presented) The device as claimed in Claim 1, wherein the illumination unit is provided such that a diameter of the illumination ray bundle on the cornea of the eye arranged in front of the device is between 2 μm and 20 μm during operation.

3. (Previously Presented) The device as claimed in Claim 1, wherein the distance-determining unit comprises an interferometer portion which, together with the cornea, forms an interferometer during operation.

4. (Previously Presented) The device as claimed in Claim 3, wherein the illumination unit is provided to emit optical radiation having a predetermined temporal coherence length, the interferometer portion comprises at least one beam splitter arranged in the path of the illumination ray bundle so as to form a reference ray bundle from the optical radiation of the illumination unit, at least one optical functional element for superimposing the detection ray bundle onto the reference ray bundle, and a unit for varying the optical path length of the reference ray bundle between the beam splitter and the optical functional element or the optical path length of the path of the illumination ray bundle after the beam splitter and/or between the spot illuminated by the illumination ray bundle on the cornea and the optical functional element, and the distance-determining unit comprises a detection unit, which suitably senses the intensity of the superimposed reference and detection ray bundles and transforms them into a distance signal.

5. (Previously Presented) The device as claimed in Claim 4, wherein the unit for varying the optical path length comprises a reflector which is movable back and forth in a substantially linear manner.

6. (Previously Presented) The device as claimed in Claim 4, wherein the unit for varying the optical path length comprises a reflector arrangement, which is rotatable or pivotable about an axis, said reflector arrangement comprising a plurality of reflecting portions each located a different distance from the axis.

7. (Previously Presented) The device as claimed in Claim 1, further comprising illumination optics for focusing the illumination ray bundle for at least one wavelength in a predetermined range of possible positions of the cornea and wherein the distance-determining unit in a detection beam path comprises detection optics, a small-aperture stop arranged following said detection optics and located in a stop plane, and a detection unit arranged following said aperture stop for detecting the optical radiation behind the small-aperture stop, wherein the stop plane is conjugated with an object plane associated with the wavelength, said object plane being located in a range of possible positions of the cornea.

8. (Previously Presented) The device as claimed in Claim 7, wherein the position of the illumination and/or detection optics and/or of the aperture stop and/or the focal length of the illumination and/or detection optics and/or the position of the illuminated spot can be changed by means of a drive.

9. (Previously Presented) The device as claimed in Claim 7, wherein optical radiation of different wavelengths can be emitted by the illumination unit, and ray bundle forming optics of the illumination unit, the illumination optics and/or the detection optics are dispersive.

10. (Previously Presented) The device as claimed in Claim 7, wherein the illumination unit is adapted for emitting optical radiation in at least two different spectral ranges.

11. (Previously Presented) The device as claimed in Claim 7, wherein the illumination unit comprises a source of radiation for emitting optical radiation in a predetermined spectral range.

12. (Previously Presented) The device as claimed in Claim 7, wherein the detection unit is positioned for spectrally and temporally resolved detection of the optical radiation behind the small-aperture stop.

13. (Previously Presented) The device as claimed in Claim 10, wherein the detection unit is adapted for detection of the optical radiation behind the small-aperture stop in a manner timed with the change of the spectral ranges of the illumination ray bundles.

14. (Previously Presented) The device as claimed in Claim 7, wherein the illumination optics and the detection optics comprise a common objective.

15. (Previously Presented) The device as claimed in Claim 14, wherein the common objective has a predetermined longitudinal chromatic aberration.

16. (Previously Presented) The device as claimed in Claim 1, comprising at least one illumination unit, which emits two illumination ray bundles and which illuminates two different areas on the cornea of the eye, and comprising at least one distance-determining unit, which receives, in a temporally resolved manner, detection ray bundles reflected by said two areas on the cornea and generates distance signals corresponding to distances of the cornea from two reference planes, said reference planes each being defined for one of the detection ray bundles relative to the distance-determining unit and the evaluating unit evaluating the distance signals and generating position or movement signals which correspond to a position or movement of the eye in two spatial directions.

17. (Previously Presented) The device as claimed in Claim 1, comprising at least one illumination unit, which emits three illumination ray bundles, which illuminate three different areas forming the corners of a triangle on the cornea of the eye, and comprising at least one distance-determining unit, which receives, in a temporally resolved manner, detection ray bundles reflected by said three areas on the cornea and generates distance signals corresponding to distances of the cornea from three reference planes, said reference planes each being defined for one of the detection ray bundles relative to the distance-determining unit and the evaluating unit evaluating the distance signals and generating position or movement signals which correspond to a position or movement of the eye in three spatial directions.

Claims 18-34 (Cancelled).

35. (Previously Presented) A method of determining a movement of an eye comprising the steps of:

radiating optical radiation onto the cornea of the eye as an illumination ray bundle;

generating distance signals corresponding to the distance of the cornea from a predetermined reference plane in a temporally resolved manner, using the optical radiation returned by the cornea as detection ray bundles; and

generating position or movement signals corresponding to a position or movement of the eye from the distance signals.

36. (Previously Presented) The method as claimed in Claim 35, wherein the illumination ray bundle has a diameter of between 2 μm and 20 μm at the cornea.

37. (Previously Presented) The method as claimed in Claim 35, further comprising the steps of coupling out a reference ray bundle from the illumination ray bundle;

superimposing the detection ray bundle on the reference ray bundle; and

generating the distance signal by detection of interferences of the superimposed ray bundles.

38. (Previously Presented) The method as claimed in Claim 37, further comprising the steps of:

varying the optical path length for the reference ray bundle before superposition, the illumination ray bundle after splitting off of the reference ray bundle and/or the detection ray bundle before superposition;

detecting the intensity of the superimposed reference and detection ray bundles in a temporally resolved manner; and

generating a distance signal on the basis of the detected intensity.

39. (Previously Presented) The method as claimed in Claim 38, further comprising the step of moving a reflector to vary the optical path length.

40. (Previously Presented) The method as claimed in Claim 39, further comprising the step of rotating a plurality of reflecting surface portions about an axis to vary the optical path length, said surface portions having different radial spacing from the axis.

41. (Previously Presented) The method as claimed in Claim 35, further comprising the steps of:

focusing the illumination ray bundle for at least one wavelength into a predetermined range of possible positions of the cornea;

focusing the detection ray bundle through detection optics into the region of a small-aperture stop located in a stop plane, said stop plane being conjugated with an object plane which is associated with the wavelength and which lies in a predetermined range of possible positions of the cornea; and

generating the distance signal by detection of the optical radiation passing through the small-aperture stop.

42. (Previously Presented) The method as claimed in Claim 41, wherein the range of possible distances of the cornea from the reference plane is scanned by changing the distance between the object plane and the small-aperture stop.

43. (Previously Presented) The method as claimed in Claim 41, wherein optical radiation of different wavelengths is used, and the illumination and/or detection ray bundle is guided through at least one strongly dispersive optical functional element.

44. (Previously Presented) The method as claimed in Claim 41, wherein illumination ray bundles with optical radiation in at least two different spectral ranges are alternately used in a predetermined time sequence.

45. (Previously Presented) The method as claimed in Claim 41, wherein the illumination ray bundle comprises optical radiation in a spectral range of 400 nm to 1700 nm.

46. (Previously Presented) The method as claimed in Claim 43, wherein the intensity of the detection ray bundle behind the small-aperture stop is detected in a spectrally and temporally resolved manner.

47. (Previously Presented) The method as claimed in Claim 44, wherein the intensity of the detection ray bundle behind the small-aperture stop is detected in a manner timed with the change of the spectral ranges of the illumination ray bundles.

48. (Previously Presented) The method as claimed in Claim 35, wherein the illumination ray bundle is radiated onto an area of the cornea at an angle of incidence of less than ten degrees

49. (Previously Presented) The method as claimed in Claim 35, wherein the illumination ray bundle is radiated onto an area of the cornea at an angle of incidence of less than five degrees.

50. (Previously Presented) The method as claimed in Claim 35, further comprising the step of illuminating at least two different areas on the cornea by at least two different illumination ray bundles;

generating distance signals relating to the distances of the cornea from corresponding predetermined reference planes in a temporally resolved manner, using the optical radiation respectively returned by the cornea as detection ray bundles: and

generating position or movement signals relating to a position or movement of the eye in at least two spatial directions on the basis of said distance signals.

51. (Previously Presented) The method as claimed in Claim 35, further comprising the steps of:

illuminating at least three different areas on the cornea forming corners of a triangle by at least three different illumination ray bundles;

generating distance signals relating to the distances of the cornea from corresponding, predetermined reference planes in a temporally resolved manner, using the optical radiation respectively returned by the cornea as detection ray bundles; and

generating position or movement signals relating to a position or movement of the eye in at least three spatial directions on the basis of said distance signals.

52. (Previously Presented) The method as claimed in Claim 35, further comprising the steps of guiding illumination and detection radiation over the eye synchronously with a therapeutic beam.